Audit Report

OFFICE OF THE INSPECTOR GENERAL

USE OF MOBILE COMPUTERS – ARMY

Report Number 91-121

September 23, 1991

Department of Defense

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

September 23, 1991

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE)
ASSISTANT SECRETARY OF THE ARMY (FINANCIAL MANAGEMENT)

SUBJECT: Audit Report on the Use of Mobile Computers -- Army (Report No. 91-121)

We are providing this final audit report for your information and use. This report resulted from our Audit on the Use of Mobile Computers -- Army. Management comments to the draft report were considered in preparing the final report. The audit, initiated by the Office of the Inspector General, DoD, was made from November 1989 through December 1990. It addressed present mobile data processing requirements and the need for proposed improvements.

The audit showed that DoD needed to increase its oversight of the Corps and Theater Automated Data Processing Service Center-Phase II mobile computer program. Nonruggedized computers were reliable and more economical than ruggedized computers. The Army ineffectively utilized soldiers who had received specialized training valued at $1.1 million.

To correct these problems, we made recommendations to the Assistant Secretary of Defense (Command, Control, COmmunications and Intelligence); the Deputy Chief of Staff of the Army for Operations and Plans; and the Commander, U.S. Army, Europe.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, the addressees must provide final comments on the unresolved recommendations and monetary benefits within 60 days of the date of this memorandum.

As required by DoD Directive 7650.3, the comments must indicate concurrence or nonconcurrence with the findings and each recommendation addressed to you. If you concur, describe the corrective actions taken or planned, the completion dates for actions already taken, and the estimated dates for completion of planned actions. If you nonconcur, you must state your specific reasons for each nonconcurrence. If appropriate, you may propose alternative methods for accomplishing desired improvements.

If you nonconcur with the estimated monetary benefits or any part thereof, you must state the amount you nonconcur with and the basis for your nonconcurrence. Recommendations and potential monetary benefits are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment.

The cooperation and courtesies extended to the audit team (listed in Appendix E) are appreciated. If you have any questions about this audit, please contact Mr. Terry L. McKinney at (703) 693-0430 (DSN 223-0430) or Mr. Carl F. Zielke at (703) 693-0453 (DSN 223-0453). The planned distribution of this report is listed in Appendix F.

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

cc: Secretary of the Army

Office of the Inspector General

AUDIT REPORT NO. 91-121 September 23, 1991
(Project No. 0FE-0024)

USE OF MOBILE COMPUTERS -- ARMY

EXECUTIVE SUMMARY

Introduction. At the time of the audit, the Army used four types of mobile computers to process data for combat service support. These included 12 Corps and Theater Automated Data Processing Service Center-Phase I (CTASC-I) systems, 339 Decentralized Automated Service Support Systems (DAS3), about 9,700 Tactical Army Combat Service Support Computer Systems (TACCS), and an undetermined number of Unit Level Computers (ULC). The Army was redesigning its standard software to open-system architecture. To accomplish this, the Army was developing the CTASC-II at a cost of about $226 million to replace the 12 CTASC-I computers and 33 of the 339 DAS3 computers. TACCS computers were to replace about 180 DAS3 computers. The Army planned to upgrade 6,292 TACCS computers at an estimated cost of $42 million. After the draft report was issued, the Army reduced the planned upgrade to 2,814 TACCS while developing application software to operate in open-system architecture on less expensive, nonruggedized computers.

Objectives. The overall objective of the audit was to evaluate the effectiveness of the Army's present mobile data processing systems and determine the need for proposed improvements. Specifically, we determined whether current systems met approved requirements and satisfied user needs, including training. Also, we evaluated internal controls and determined compliance with applicable laws and regulations.

Audit Results. The audit showed that justification used to support the CTASC-II system was incomplete and misleading. The current mobile computer systems, the CTASC-I and DAS3, were reliable, maintainable, and met the Army's peacetime and wartime processing requirements. Commercial nonruggedized computers were more reliable and cost less than ruggedized computers. Soldiers who had received specialized training valued at $1.1 million were ineffectively utilized. Implementation of the recommendations could save the Army about $21.8 million and ensure better utilization of TACCS-trained soldiers.

o The Army planned to spend about $226 million to replace its current mobile computers because they were unreliable and expensive to maintain, lacked mobility, and could not meet the Army's data processing requirements. We found that the current systems were reliable, mobile, cost less to maintain then the planned system, and met the Army's processing needs. Justification used to support the CTASC-II system was incomplete

and misleading. The Required Operational Capability (ROC) document did not show the need for redesigning the system software to fit open-system architecture. At the end of FY 1991, the Army will have spent about $90 million on equipment and software development for the CTASC-II system. The Army planned to spend about $42 million upgrading 6,292 TACCS computers. After the draft report was issued, the Army reduced the planned upgrade to 2,814 TACCS while developing application software to operate in open-system architecture on less expensive, nonruggedized computers. This could save about $21.8 million **(Finding A).**

o The Army ineffectively utilized soldiers who had received specialized training. The U.S, Army, Europe had not updated the Modified Tables of Organization and Equipment (MTOE) to reflect Additional Skill Identifier (ASI) codes associated with the TACCS computer system; commanders assigned untrained soldiers to operate TACCS computers; and commanders had not developed sustainment training programs. Accordingly, training valued at $1.1 million had not been used **(Finding B).**

Internal Controls. Internal controls over the acquisition and management of mobile computers were generally adequate. We reviewed the implementation of the Federal Managers' Financial Integrity Act at the project management office for Tactical Management Information Systems (TACMIS) and at Headquarters, U.S. Army, Europe as it related to our audit.

Compliance with Laws and Regulations. The Army did not adhere to its policy requirements for managing the CTASC-II. Army Regulation 25-3, "Army Life-Cycle Management of Information Systems," December 26, 1989, and Letter of Instruction (LOI) for Performing Economic Analysis (EA) and Cost Requirements for Automated Information Systems (AIS)," December 6, 1990, require that life-cycle cost estimates be well-documented. This required documentation was not available to support the economic analysis used to justify the CTASC-II program.

Potential Benefits of Audit. Recommendations in this report, if implemented, will result in compliance with regulations, improved economy and efficiency of operations and better use of trained soldiers, and potential monetary savings of $21.8 million **(Appendix C).**

Summary of Recommendations. We recommended that OSD increase its oversight of the CTASC-II program; that the Army use commercial, nonruggedized computers and; modify the Tables of Organization and Equipment (TOE) to reflect ASI's for TACCS operators; and that commanders be notified of the training team available at 1st Personnel Command to train computer operators.

Management Comments. A draft of this report was provided to the Army on February 21, 1991. Initial comments to the draft report were received from the Army on April 24, 1991. Revised comments

to the draft were received on August 27, 1991, and are provided at Appendix B. Management concurred with Finding B and Recommendation B.1., but nonconcurred with Finding A and Recommendations A.1., A.2., A.3., and B.2. In Recommendation A.1., we recommended termination of the Corps and Theater Automated Data Processing Service Center-Phase II (CTASC-II) because the current systems (CTASC-I and DAS3) met the Army's needs for mobility, reliability, and data processing. The Army disagreed, stating that the current systems were at the end of their useful lives. Management further stated that the current systems were hard to maintain, did not have open-system architecture, and were batch-oriented systems; that software being developed and fielded was not designed to operate on them; that their large size hindered mobility, and that they did not communicate with tactical communication systems; and that our estimated cost savings were overstated.

o In Recommendation A.2., we recommended that the Army terminate the upgrade to the Tactical Army Combat Service Support Computer System (TACCS), and in Recommendation A.3., we recommended that the Army replace TACCS with commercial, nonruggedized computers. The Army stated that it reduced the number of planned TACCS upgrades from 6,292 to 2,814 and that after FY 1991, no more TACCS systems will be upgraded. The Army further stated that we did not consider software conversion costs when we compared upgrading the TACCS to using nonruggedized computers such as Desktop III.

o In Recommendation B.2., we recommended that the Commander, U.S., Army, Europe notify commanders to provide sustainment training to TACCS operators in compliance with Army Regulation 350-35. Management stated that sustainment training is an ongoing command responsibility. A military training team had been created at 1st Personnel Command (1st PERSCOM) to help commanders train their soldiers on TACCS/SIDPERS.

Audit Response. We found that the CTASC-I and DAS3 were reliable, mobile, cost less to maintain than the CTASC-II, and met the Army's data processing needs. The CTASC-I and DAS3 were used successfully in Operations Desert Shield and Desert Storm. They were moved quickly over long distances and performed successfully. While CTASC-II has more up-to-date technology and may improve the Army's data processing capability, the Army had not shown that CTASC-II could meet its wartime processing needs, including data integrity and data transfer, more successfully than CTASC-I and DAS3. In discussions with management, we learned that the Army's goal was to convert to open-system architecture and to use mobile computers that could be driven on and off C-130 aircraft. Also, the standard software for mobile computers had been redesigned so that the CTASC-II could better fulfill its combat service support mission. We changed Recommendation A.1. to request that OSD increase its oversight of the CTASC-II program. We requested comments to the final report from the Assistant Secretary of Defense (Command, Control, Communications and Intelligence).

o We did not include software conversion costs in our analysis because the software used on the TACCS computer will have to be converted to open-system architecture. The Federal Information Resources Management Regulation (FIRMR) also states that costs are not to be included for software conversion. Our analysis of computers used by Army units in Europe showed that commercial nonruggedized computers were more reliable than ruggedized computers. In Operations Desert Shield and Desert Storm, the same problems affected both ruggedized and commercial computers. Internal boards had to be reseated in some commercial computers prior to their use. Using commercial nonruggedized computers instead of upgrading the additional 3,478 TACCS could save an estimated $21.8 million. No comments are required for Recommendation A.2., because the Army's decision not to upgrade TACCS after FY 1991 meets the intent of the recommendation. Army comments are required on Recommendation A.3. and the potential monetary benefits of $21.8 million.

o We changed Recommendation B.2. to request that commanders be notified of the availability of the military training team at 1st PERSCOM. We asked that management provide comments to the revised recommendation.

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Prepared by:
Financial Management Directorate
Project No. 0FE-0024

USE OF MOBILE COMPUTERS -- ARMY

PART I - INTRODUCTION

Background

The Army used four types of mobile computer systems to sustain its combat service support for supply, maintenance, ammunition, personnel, medical, transportation, finance, and property book operations. The four systems ran standard Army-developed software. The systems were the Corps and Theater Automated Data Processing Service Center (CTASC-I), Decentralized Automated Service Support System (DAS3), Tactical Army Combat Service Support Computer System (TACCS), and Unit Level Computer (ULC).

The Army used van-mounted and portable automatic data processing equipment at echelons above corps (EAC), corps, and division levels to process logistical, personnel, and medical service support information. The van-mounted systems were the CTASC-I and the DAS3. The CTASC-I consisted of three mobile (semitrailer) vans containing an IBM 4341 computer with a printer, tape library, and mass storage unit; a maintenance truck; two 100-kilowatt generators; and three dedicated 5-ton tractors. The DAS3 consisted of a semitrailer van containing a Honeywell Level 6 computer, printer, and tape storage; a generator system; and a dedicated 5-ton tractor. The proposed replacement for the CTASC-I and selected DAS3 systems was the CTASC-II, which consisted of a Sperry 5000/95 computer housed in three shelters mounted on commercial utility cargo vehicles (CUCV's) and one standard integrated command post system (SICPS) tent. The CUCV's would be used to move the trailers containing the two environmental control units and the SICPS tent. The CTASC-II system did not have a dedicated power source or a vehicle to move one if a power source were provided later. The CTASC-II would provide automatic data processing support for the same functional areas as the CTASC-I. Each CTASC-II was designed to run one standard software system, while the CTASC-I was designed to run more than one system. The Army will field 62 CTASC-II systems to replace 45 systems (12 CTASC-I's and 33 DAS3's). An additional 180 DAS3's will be replaced with TACCS computers, and about 125 DAS3's will remain in use.

The TACCS computer, used primarily at division and battalion levels, was a ruggedized Burroughs Model 26 microcomputer. It was designed to be taken to the field in a ruggedized carrying case and operated by functional personnel. The computer ran standard software for personnel, supply, maintenance, transportation, ammunition, and property book operations. The Army planned to upgrade the processing capacity of 6,292 TACCS computers at a cost of about $42 million.

The ULC was used at the unit level to support the Unit Level Logistics System. Initially, the ULC was to be a ruggedized computer, but due to its high cost ($15,000), the Army decided to

use nonruggedized, commercially available computers, the Zenith Z-248 desktop (about $5,000 when completely configured) and the Zenith Z-184 laptop (about $2,200 when completely configured). Ruggedized carrying cases were used to take these computers to the field. Because of the reliability and low cost of the nonruggedized computers, the Army planned to use them to process the Theater Army Medical Management Information System-Division, the Standard Property Book System, and the Department of the Army Movements Management System-Container Operations module.

The Army's Tables of Organization and Equipment (TOE) identify authorized personnel and equipment. Unit commanders requisition and assign trained soldiers to fill positions identified on the TOE. Commanders are responsible for providing soldiers with sustainment training to ensure continued expertise.

Objective and Scope

The overall objective of this audit was to evaluate the effectiveness of the Army's present systems and determine the need for proposed improvements. Specifically, we determined whether the current systems met approved requirements and satisfied user needs, including training, and whether proposed improvements were needed. We also evaluated internal controls over the acquisition and management of mobile data processing and determined compliance with applicable laws and regulations.

To accomplish the audit, we identified the Army's mobile computers, mobility requirements, and planned improvements. We performed our field work in the continental United States and in Europe. Appendix D lists activities visited or contacted during the audit. At the time of the audit, the Army was developing two new systems: the CTASC-II and the Army Command and Control System, Common Hardware/Software (ACCS CH/S). We excluded the ACCS CH/S from the audit because the General Accounting Office (GAO) was reviewing the system. We also reviewed maintenance records and after-action reports, interviewed operators, and evaluated responses from operators to a questionnaire on computer training. We reviewed operational records covering the period January 1, 1989, through May 1990. We also reviewed internal control procedures over the acquisition and management of mobile data processing and assessed compliance with applicable laws and regulations.

This self-initiated economy and efficiency audit was made from November 1989 through December 1990 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of the internal controls as were considered necessary.

Internal Controls

We reviewed the implementation of the Federal Managers' Financial Integrity Act at the project management office for Tactical Management Information Systems (TACMIS) and at Headquarters, U.S. Army, Europe as it related to our audit. Internal control procedures are to ensure that:

o acquisition of automatic data processing equipment is economical and meets user needs,

o processing operations are sufficient to meet peacetime and wartime needs, and

o data processing operations are periodically tested to ensure that backup processing is adequate to meet those needs.

Internal controls over the acquisition and management of mobile data processing were considered effective, and we found no material deficiencies. In addition, the Army generally complied with laws and regulations relating to the audit.

Prior Audit Coverage

The Inspector General, DoD, Report No. 88-056, "Summary Report on the Defense-Wide Audit of Mobilization Readiness of Automated Combat Service Support Functions," December 4, 1987, showed that the Services had integrated small ruggedized transportable computers into their battlefield strategies. The report also showed that improvements were needed in policy, management, and implementation of computer systems. Confusion existed among the Services on the applicability of life-cycle management policies and procedures from the Office of the Secretary of Defense (OSD). The Services used the confusion to avoid OSD oversight and ignore life-cycle management principles and practices. A recommendation was made that the Comptroller of the Department of Defense revise DoD Directives 7920.1 and 7920.2 to include general-purpose automatic data processing equipment that is classified as mission-critical computer resources. The Deputy Assistant Secretary of Defense (Management Systems) concurred with the recommendations, and policy changes were implemented on March 7, 1990.

Army Audit Agency Report No. SW 88-606, "Maintenance of Automatic Data Processing Equipment," April 11, 1988, stated that the Army's policy for repairing and exchanging equipment in support of TACCS was not published and implemented. Because the Army's policy was not implemented, support procedures for maintaining automatic data processing equipment were inconsistent; adequate maintenance support of tactical equipment could not be ensured for mobilization or deployment; contract maintenance was done by soldiers and not by contractor personnel; and floating operational readiness equipment for maintenance support was used incorrectly. The report recommended that Army regulations

include policies and procedures for maintenance support and specific responsibilities of contractors and tactical systems repairers, and that the Army determine the amount of contractor nonsupport and recoup payments made for work not performed by contractors. The Army concurred and implemented the recommendations by November 30, 1988.

Army Audit Agency Report No. EU 89-4, "Automation Support to Headquarters, U.S. Army, Europe, and Seventh Army, Heidelberg, Germany," February 24, 1989, stated that comprehensive and systematic programs for automation training had not been established, and that more centralized control was needed to ensure that individual development plans were prepared, automation training needs were identified, funding was obtained, and appropriate personnel received training. The report recommended that information managers at each activity assist supervisors in preparing individual development plans, consolidate requirements for automation training, establish training plans, advise supervisors of available training, and assist in scheduling attendance. The report also recommended that a cost-benefit analysis be performed for establishing an in-house automation training program. The command agreed with the recommendations and completed corrective actions by March 31, 1989.

Army Audit Agency Report No. EU 87-204, "Management of Computers in Tactical Units, U.S. Army, Europe, and Seventh Army," October 30, 1986, reviewed Army procedures for microcomputer acquisition, wartime automation planning, the security of Decentralized Automated Service Support Systems (DAS3), and implementation of the internal control program for computers. The report stated that tactical units acquired nontactical microcomputers without proper approval, and that nontactical computers duplicated efforts of the automated combat service support systems. In addition, operational plans were not fully developed or tested, and mobility exercises were not conducted as required. The report recommended that the U.S. Army, Europe, and Seventh Army revise approval procedures for the acquisition of nontactical microcomputers, redistribute the microcomputers to authorized units, prepare wartime automation plans, train personnel in battlefield security, develop continuity of operations plans, and conduct mobility exercises. The command concurred with all recommendations and initiated corrective actions. All actions were implemented by December 18, 1990.

PART II - FINDINGS AND RECOMMENDATIONS

A. Mobile Computer Systems

FINDING

The Army's mobile computer replacement program needed increased oversight by the Office of the Secretary of Defense (OSD). Oversight of the Corps and Theater Automated Data Processing Service Center-Phase II (CTASC-II) was given to the Army in August 1988. To meet its combat service support mission more efficiently and effectively, the Army was redesigning its standard management information system so it would provide up-to-date mobile data processing with open-system architecture and could be driven on and off aircraft. Open-system architecture is the capability to transport software to dissimilar computers without modifying the software. The Army's justification for replacing its current mobile systems, the CTASC-I and Decentralized Automated Service Support System (DAS3), cited problems with mobility, reliability, and maintenance. We found that the CTASC-I and DAS3 met the Army's peacetime and wartime needs for mobility, reliability, and data processing. However, the systems did not have open-system architecture. Also, the Army planned to upgrade 6,292 ruggedized Tactical Army Combat Service Support Computer System (TACCS) computers instead of using more economical, nonruggedized commercial computers. After we issued the draft report, the Army reduced the number of TACCS computers it planned to upgrade to 2,814. Those computers will be used while software is redesigned to fit open-system architecture and operate on commercial off-the-shelf (nonruggedized) computer equipment. The use of nonruggedized, commercially available computers to replace the other 3,478 TACCS computers would save about $21.8 million.

DISCUSSION OF DETAILS

Background. The Army's air-land battle doctrine stated a need at corps and EAC levels for a standard, mobile, survivable ADP system to process logistical, personnel, and medical service support information for combat service support missions. The CTASC-I and DAS3 systems were considered too large for strategic and tactical mobility, required excessive supplies and maintenance support, and did not provide adequate data processing speed and power. The Army planned to replace the 12 CTASC-I's and over 200 of the 339 DAS3's with 62 CTASC-II's and an unspecified number of TACCS computers. An additional 17 CTASC-II systems were planned for nonoperational uses such as software development and training. The CTASC-II would provide improved mobility and a smaller target. It would not counter a specific threat, but would provide a force multiplier by speeding up the combat service support mission at corps and EAC levels. The CTASC-II consisted of a Sperry 5000-95 minicomputer, housed in three shelters mounted on commercial utility cargo vehicles, and transportable by C-130 aircraft. The estimated cost of the CTASC-II program was $226 million.

The Army planned to upgrade 6,292 of its 9,700 TACCS microcomputers to meet increased capacity needs and allow the replacement of about 180 van-mounted DAS3 systems. The upgraded TACCS would also support open-system architecture. The cost of this upgrade was estimated at $42 million.

Oversight of CTASC-II Program. On August 25, 1988, OSD made the Army responsible for oversight of the CTASC-II. In its justification for the CTASC-II, the Army stated that the current systems were costly to maintain and had mobility and maintenance problems. We found that, while the CTASC-I's and DAS3's did not have open-system architecture, they cost less to maintain than the CTASC-II, were reliable, and met the Army's peacetime and wartime requirements for mobility and data processing. The Army's Required Operational Capability (ROC) document stated that the CTASC-II was not mission-essential and did not identify a specific need for open-system architecture.

When we reviewed the Army's claim that the CTASC-I and DAS3 were expensive to maintain, we found that their maintenance costs were less than those estimated for the CTASC-II. In FY 1990, the average maintenance cost was $84,500 for the CTASC-I and $22,732 for the DAS3. The estimated annual maintenance cost of each CTASC-II was $125,000. The annual cost for the software license fee was $20,400 for each CTASC-II, $12,123 for each CTASC-I, and $330 for each DAS3.

Cost Comparison of Annual Maintenance and License Fees for the CTASC-I and DAS3 with CTASC-II

Annual Cost	Current Systems		Proposed System
	CTASC-I	DAS3	CTASC-II
Maintenance	$84,500	$22,732	$125,000
License Fee	$12,123	$ 330	$ 20,400

Personnel savings were misleading. The ROC document stated that the CTASC-II would not increase the force structure and could reduce it. Personnel savings were based on all personnel (up to 40) assigned to the CTASC-I and all personnel (up to 33) assigned to the DAS3; only computer operators (74D) were shown for the CTASC-II. Support personnel, such as cooks, vehicle mechanics, and clerks, were included for the CTASC-I and DAS3 systems. The CTASC-I had nine computer operators, compared to seven for the CTASC-II.

Other data were also misleading. The CTASC-II was powered by generators that belonged to Army units, while the CTASC-I and DAS3 had their own generators. Army documentation also stated that the CTASC-II allowed 12 CTASC-I systems and over 200 DAS3 systems to be phased out. The CTASC-II would directly replace the 12 CTASC-I's and 33 DAS3's. About 180 DAS3's would be

replaced with upgraded TACCS computers, and about 125 DAS3's would remain in use after the CTASC-II was fielded. Replacement cost for the 180 DAS3's should have been included in the cost of the CTASC-II program.

Mobility. To determine whether the CTASC-I and DAS3 systems met the Army's mobility needs, we reviewed after-action reports of field exercises, mobility operations plans, and continuity of operations plans. We reviewed the mobility records for the 7 CTASC-I systems and 27 of the 102 DAS3 systems in Europe at EAC level, V Corps, and VII Corps. All CTASC-I systems and 24 of 27 DAS3 computer systems met mobility requirements. The other three DAS3 systems had not been moved to test their mobility. Two systems were being operated by German nationals and were not used in field exercises, and the other system had not been moved because of a structural problem in the van used to move it. While the CTASC-II is smaller and more mobile than the CTASC-I and DAS3, the Army planned to use 62 CTASC-II's to replace 45 current systems (12 CTASC-I's and 33 DAS3's). However, the CTASC-II can be driven on and off the C-130 aircraft, while the CTASC-I and DAS3 require larger aircraft.

Maintainability. To evaluate maintainability and reliability of the CTASC-I and DAS3 systems, we reviewed maintenance records for the 7 CTASC-I and 27 DAS3 systems for calendar year 1989. Downtime was less than 1 percent, and the systems met their processing requirements.

Contractors maintained the CTASC-I, while the DAS3 was maintained by Army personnel. Contractor maintenance was also planned for the CTASC-II. Discussions with CTASC-I and DAS3 operating personnel and our review of maintenance records showed that the CTASC-I and DAS3 were reliable systems. Performance of the 4 CTASC-I's and more than 70 DAS3's in Saudi Arabia also proved that the systems were reliable and maintainable.

Need for Upgrading TACCS. The Army planned to upgrade 6,292 TACCS computers; this upgrade was not cost-effective (see Appendix A). After we issued the draft report, the Army reduced the upgrade to about 2,814. The 2,814 computers cost $18 million and were needed while software with open-system architecture was developed to run on commercial, nonruggedized computers that are more economical. Use of nonruggedized computers could save about $22 million.

Need for Ruggedized Computers. Ruggedized computers were not needed. TACCS was a ruggedized computer designed to travel to the field in a ruggedized carrying case. However, nonruggedized computers had proved their reliability in field exercises. One such computer was the ULC, a commercial, nonruggedized computer with a ruggedized carrying case.

To compare reliability, we evaluated maintenance records from January 1989 through May 1990 for the ruggedized TACCS computer and the nonruggedized ULC computer. The ULC required less maintenance than the TACCS. As shown below, the TACCS had a 91-percent repair rate, and the nonruggedized ULC had a 61-percent repair rate.

Comparison of Repairs to TACCS and ULC

Computer	Quantity	Repairs	Repair Rate
TACCS	2,376	2,168	91.25 percent
ULC	324	198	61.11 percent

We observed nonruggedized computers at installations and on Reforger 1990, a major field exercise in Europe. Units reported no serious problems with nonruggedized computers during field exercises. Operating personnel and staff at U.S. Army, Europe (USAREUR) headquarters stated that nonruggedized computers performed well in the field and met their needs. They stated that the only protection needed was a ruggedized carrying case, an air filter, and a protective covering for the keyboard.

Lack of preventive maintenance caused problems with dust and dirt on both the TACCS and the ULC. Operators who cleaned their computers daily while on exercises, and at least weekly while in garrison, stated that they had no problems. Operators who did not clean their computers reported problems with dirty disk drives and heads. These problems were usually corrected at the unit level, not by the contractor.

Because of the high cost ($15,000) of the ACCS CH/S computer, the Army decided to use nonruggedized computers. The Army fielded the Theater Army Medical Management Information System-Division and the Unit Level Logistics System on the Zenith (Z-248) computer (about $5,000 when completely configured). More recently, the Army decided to use commercial, nonruggedized computers for the Department of the Army Movements Management System-Container Operations module and the Standard Property Book System. The Army should continue to use nonruggedized commercial computers instead of more expensive ruggedized computers unless ruggedization is specifically justified.

RECOMMENDATIONS FOR CORRECTIVE ACTION

We recommend that:

1. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) increase oversight of the Army's Corps and Theater Automated Data Processing Service System Center-Phase II program to ensure that it is economically justified and specifically meets the Army's air-land battle doctrine.

2. The U.S. Army Director of Information Systems for Command, Control, Communications and Computers terminate the upgrade to the Tactical Army Combat Service Support Computer System.

3. The Deputy Chief of Staff of the Army for Operations and Plans require that nonruggedized off-the-shelf computers be used instead of more costly ruggedized computers unless ruggedization is specifically justified.

MANAGEMENT COMMENTS

In its revised comments, management disagreed with Finding A and Recommendations A.1., A.2., and A.3. Management stated that the auditors' conclusions were based on incomplete information and not on total automated information system (AIS) architecture. AIS architecture includes hardware, applications software, executive system software, maintenance, and current and future operational requirements. Management further stated that the report primarily examined hardware issues and maintenance, with minimum coverage of the other AIS components; that the report did not address the major hardware issues (proprietary hardware and open-systems architecture) and software issues (proprietary software and the cost of converting to new hardware). Management stated that our report addressed the capabilities of existing systems to meet the operational requirements for which they were designed, but did not discuss how well the existing systems meet the current and future operational requirements for hardware and software.

For the following reasons, management nonconcurred with Recommendation A.1. for increased OSD oversight for the Corps/Theater Automated Data Processing Service Center Phase-II (CTASC-II) program.

o At the Army's request, OSD transferred oversight of the CTASC-II program to the Army in August 1988.

o The Army has always adhered to regulatory and policy requirements for managing the program, and the Army believes that the recommendation for oversight is not justified and in the best interests of improving DoD's tactical automation.

The Army made the following additional comments.

o The CTASC-I and DAS3 are proprietary hardware systems that use old technology, which makes maintaining the hardware and procuring repair parts very expensive. This is especially true of the DAS3 system, which has been in the Army since the early 1980's.

o The lack of open-system architecture in the CTASC-I and DAS3 hinders interaction between dissimilar systems.

o The CTASC-I and DAS3 met the operational requirements for which they were designed; however, they cannot fully meet the current and future requirements. The CTASC-I and DAS3 depend on batch processing and data input terminals. This creates choke points that slow the flow of information. Neither system can be used with local area networks, and the software cannot interact with other systems to provide real-time information.

o The large size and number of vehicles needed to transport the CTASC-I and DAS3 makes them more visible targets and hinders their mobility. The CTASC-I and DAS3 systems cannot be easily transported by C-130 or C-141 aircraft.

o Software now being developed and fielded is not designed to operate on the CTASC-I and DAS3. Failure to field the new software systems will deprive combat service support units of needed functions.

o Although the CTASC-I performed well in Saudi Arabia, there was doubt that the four CTASC-I's could support requirements promptly. To improve performance levels, the Commander, U.S. Army Central Support Command (Provisional) requested that the four systems be upgraded. The cost would have been $1.0 million per system. While the systems were not upgraded, the request demonstrated shortcomings in the CTASC-I system.

o The current systems are manpower-intensive. The ROC document for CTASC-II identifies a potential reduction in force structure when the CTASC-II systems are fielded.

o For CTASC-I, the report considers only maintenance costs and does not give estimates for the DAS3 systems being replaced. No personnel savings are identified for replacing the CTASC-I and DAS3 with the CTASC-II.

Regarding Recommendation A.2., to terminate the upgrade to the TACCS computer, and Recommendation A.3., to replace the TACCS with commercial nonruggedized computers unless ruggedization is specifically justified, management comments follow:

o The Army will procure about half of the upgraded TACCS. No additional TACCS will be retrofitted after FY 1991.

o The Army disagreed with the finding that nonruggedized, commercially available computers are more economical than ruggedized computers. The analysis did not address major cost factors.

o The draft report stated that the Desktop III computer could be configured with equal or greater capacity at a lower cost than the planned upgrade. This conclusion did not address cost elements such as software conversion, documentation, and operator training. The software currently operating on the TACCS

computer would need to be redesigned and rewritten to run on commercial (non-UNISYS) computers. In its initial evaluation of the TACCS-E upgrade, the Army addressed conversion costs of various systems. The Army found that most hardware systems had major software application costs, which made those options more expensive. Also, no funding is available in the near future for conversion.

o The auditors concluded that the nonruggedized Zenith Unit Level Computer (ULC) was more reliable than the TACCS. The comparison showed a density of 2,376 TACCS requiring 2,168 repairs and 324 Zenith computers requiring 198 repairs. The TACCS usually consists of two computers (a master logic module and a remote logic module) and is more complex and more capable. To accurately compare the TACCS with the ULC would require doubling the TACCS density because more components are subject to failure.

Management believes it is proceeding in the most economical, cost-effective manner. CTASC-II, TACCS and TACCS-E are the primary systems of the Army's combat service support architecture. Additionally, common hardware and software (CHS) systems will be used to support selected applications. The CTASC-I and DAS3 systems have reached the end of their economic and operational life. Use of commercial systems is considered and sometimes selected (i.e., CTASC-II terminals) where the operating environment is less harsh.

AUDIT RESPONSE TO MANAGEMENT'S COMMENTS

Based on the Army's comments and on meetings with OSD and Army personnel, we changed Recommendation A.1. to recommend that the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) increase oversight of the CTASC-II program. We made this change because of the time and resources already invested in developing software to operate on the CTASC-II and because of our concerns about justification used to support development of the CTASC-II system.

The air-land battle doctrine requires a standardized, mobile, survivable ADP system to process logistical, personnel, and medical service support information at corps and EAC levels. The Required Operational Capability (ROC) document for the CTASC-II, dated January 4, 1990, stated that to support its corps- and EAC-level missions, the Army needed to replace the CTASC-I and DAS3 systems with ADP equipment that was smaller, more mobile, and survivable, with higher technology and lower support requirements. The CTASC-II would not counter a specific threat, but would provide a force multiplier effect. The ROC specifically stated that the CTASC-II was not mission-critical. Based on Army doctrine, a "push system" will be used in wartime. Army Field Manual 63-20, "Forward Support Battalion," February 26, 1990, Chapter 7, states, "A push system is the initial go-to-war supply system in an undeveloped theater." When

the theater stablizes, the supply system is a push system to the battalion support area for critical supplies, especially during high-intensity combat operations. With a "push" system, automation is not essential to process requisitions based on usage.

The Army effectively transported and used 4 CTASC-I's and more than 70 DAS3's in Saudi Arabia. The systems were moved numerous times, some over long distances, and performed better than expected. One DAS3 was moved two times over 700 miles. Two other DAS3's were moved 450 to 500 miles, and the CTASC-I's were moved 50 to 65 miles without any significant problems. The CTASC-II that supported supply operations in Saudi Arabia was used to capacity, and only 10 of 29 terminals could be used on-line even after enhancements were added. A request was made to upgrade the CTASC-I so it could meet increased processing requirements in the event of hostilities. The upgrade required only minor changes to the operating system and no changes to the application software. The time needed to upgrade the system was estimated at 48 hours.

We changed recommendation A.1. from termination of the CTASC-II program to recommending that OSD increase its oversight of the CTASC-II program. Although Recommendation A.1. is directed to OSD in the revised report, not to the Army, we are responding to the Army's comments.

o The Army has not adhered to its policy requirements for managing the CTASC-II. Army Regulation 25-3, "Army Life-Cycle Management of Information Systems," December 26, 1989, and "Letter of Instruction (LOI) for Performing Economic Analysis (EA) and Cost Requirements for Automated Information Systems (AIS)," December 6, 1990, require that life-cycle cost estimates be well-documented. The documentation for each cost estimate in the economic analysis should allow an independent re-creation of the estimates and with similar results. Independent estimates had not been made, even though the CTASC-II program received Milestone II approval in August 1988. We are not proposing that the current systems not be replaced, but that OSD increase its oversight of CTASC-II so that all costs and benefits are properly identified and supported as required by OSD and Army policies.

o The CTASC-II has proprietary hardware and software. The annual licensing fee for the operating software for each CTASC-II is $20,400 annually, or $8,277 more than the licensing fee of $12,123 for each CTASC-I. The annual licensing fee for each DAS3 is $330. The average cost for each DAS3 system in FY 1990 was $22,732 ($7,706,309 for 339 DAS3 systems). This included depot expenditures, spare parts, and contract services. The estimated annual maintenance cost of each CTASC-II was $125,000.

o The current systems do not have open-system architecture; however, the CTASC-II does not have full open-system architecture either. Data can be transferred between the TACCS, DAS3, and CTASC-I systems. In Saudi Arabia, the systems met the Army's wartime requirements for data processing.

o The Army's comments implied that CTASC-I and DAS3 did not meet the air-land operations doctrine. The doctrine does not dictate a real-time system. Army doctrine relies on a "push system" in wartime, so there is no mission-critical requirement for the CTASC-II, and the current systems met the Army's needs in Saudi Arabia. The doctrine does not imply centralized control with decentralized execution, but that data be processed in a timely manner.

o One advantage of batch processing is processing mass quantities of data. A real-time system increases demands on the communication network, which in our opinion, is a weak point in the Army's automation architecture. In Saudi Arabia, the CTASC-II used batch processing, which decreased competition for processing time on the system. Only 10 of 29 user terminals could be used on-line. Army Field Manual 63-21, "Main Support Battalion," August 7, 1990, Chapter 3, states that mobile subscriber equipment (MSE) is primarily designed for voice communications. Until data transfer systems become available or MSE is enhanced with packet switching, automation terminals should be kept to a minimum. Bulk data requirements should be met with another means of transfer, such as couriers. Data are currently moved between echelons using floppy disks and courier service. The current systems cannot interface with tactical communication systems such as MSE, but this capability can be added. At present, MSE lacks the capacity to handle this data traffic in wartime.

o The functional systems, such as supply, transportation, and personnel, are being processed on the CTASC-I and DAS3 systems. We agree that enhancements in the new software systems will be lost unless the software processed on the current systems is modified. This was a decision the Army made; however, the enhancements could have been designed into the software processed on the current systems.

o While the size of the current systems may affect their mobility and visibility as targets, we found that the systems met their mobility requirements. The CTASC-II's greater mobility does not mean that the current systems cannot meet the Army's mobility requirements. The current systems were used in Saudi Arabia, and no after-action reports cited any mobility problems that prevented units from meeting their missions.

o The CTASC-I could have been upgraded without impairing the mission. The upgrade was expected to take about 48 hours, with only minor changes to the operating system and no changes to the application software. The ability to upgrade a current

system quickly and with no impairment of wartime operations is an excellent option because expansion is accomplished only when it is needed. The Army's decision to use another alternative instead of upgrading the CTASC-I showed fiscal responsibility.

o We disagree that replacing the current systems with the CTASC-II will result in large manpower savings. The CTASC-I and DAS3 are self-supporting systems, while the CTASC-II is not self-supporting. Staffing for the current systems includes cooks, repair personnel, vehicle mechanics, and supply specialists. Each CTASC-I has nine 74D computer operators, and the CTASC-II has seven. Because the Army plans to replace up to 45 current systems (12 CTASC-I's and 33 DAS3's) with 62 CTASC-II systems, any Army-wide personnel savings are doubtful. We found no verifiable documentation showing a net decrease in Army-wide staffing with CTASC-II. We validated this lack of verifiable documentation with the TRADOC Analysis Center on August 19, 1991.

o Personnel costs were not included because personnel assigned to the current systems may have to be redistributed to units supporting the CTASC-II system. Unlike the CTASC-II, the current systems are self-supporting. Therefore, the total Army personnel stength probably would not change. Staff members at Fort Gordon did not have documentation to show how the estimated personnel savings occurred, and the employees who had performed the analysis had retired.

Regarding Recommendation A.2., the Army does not plan to procure or upgrade any addition TACCS systems after FY 1991. The Army decreased its planned upgrade from 6,292 to 2,814 computers, a potential savings of about $21.8 million, while it develops application software to open-system architecture. The Army's comments cited 2,990 computers, but clarification from the project management office for TACMIS showed 2,814 systems. The Army's action meets the intent of this recommendation.

The Federal Information Resources Managment Regulation states that when software is to be converted later, conversion costs are not to be included in the selection of available alternatives. Therefore, we did not consider software conversion costs and operator training costs in the comparison between Desktop III and upgrading TACCS.

We changed Recommendation A.3. to read, "require that nonruggedized off-the-shelf computers be used instead of more costly ruggedized computers, unless ruggedization is specifically justified." We addressed this recommendation to the Deputy Chief of Staff of the Army for Operations and Plans.

B. Training And Assignments Of TACCS Users

FINDING

Although 203 soldiers assigned to Europe had received training valued at $1.1 million on the Tactical Army Combat Service Support Computer System/Standard Army Maintenance System (TACCS/SAMS), only 16 were working on TACCS computer systems. The fielding plan showed that over 400 soldiers with TACCS/SAMS training were needed in Europe, but only 19 positions had been documented in the Modified Table of Organization and Equipment (MTOE), and 12 positions had been coded in the personnel records. Soldiers received training based on the fielding plan. The MTOE and Table of Distribution and Allowances (TDA) had not been updated to reflect the additional requirements. Personnel records showed that soldiers trained on TACCS/SAMS were assigned to only 2 of the 12 coded positions. This occurred because soldiers were assigned based on Military Occupational Specialty (MOS) without regard to Additional Skill Identifier (ASI). Further, unit commanders had not implemented sustainment training programs for TACCS operators. Accordingly, training valued at $1.1 million had not been used.

DISCUSSION OF DETAILS

Background. Army internal control procedures establish responsibilities for determining additional skill requirements, identifying training requirements, developing training programs, and requesting and assigning soldiers. The Army's Tables of Organization and Equipment (TOE) and Modified TOE (MTOE) are the official lists of authorized personnel and equipment. The documents show additional skill requirements that are authorized for each unit. Army Regulation (AR) 71-31, "Management System for Tables of Organization and Equipment," July 20, 1989, prescribes policies, procedures, and responsibilities for developing, processing, reviewing, approving, and publishing TOE/MTOE documents. ASI changes are classified as minor changes to the TOE/MTOE and are the responsibility of the major Army command (MACOM). After the TOE/MTOE is modified, records in the personnel data base are updated to reflect those changes. Commanders use the personnel records to requisition and assign authorized personnel identified to their units.

AR 611-201, "Military Occupational Classification and Structure," Chapter 6, states that ASI's are used to identify specialized skills, qualifications, and requirements that are closely related to and in addition to the skills in the MOS. The three ASI's related to TACCS Standard Army Management Information Systems (STAMIS's) are:

- o B5: Tactical Army Combat Service Support Computer System/Standard Army Maintenance System (TACCS/SAMS),

o R3: Tactical Army Combat Service Support Computer System/Standard Installation and Division Personnel System (TACCS/SIDPERS),

o G3: Standard Property Book System-Redesign (SPBS-R).

The requirement for the R3 code ended on April 11, 1990, because all Personnel Specialists were to receive TACCS/SIDPERS training. However, only 8 percent of the Equipment Records and Parts Specialists (76C/B5), Unit Supply Specialists (76Y/G3), and Senior Supply/Service Sergeants (76Z/G3) were to receive TACCS training.

A requisition can contain up to nine digits, including the basic three-digit MOS and two-digit ASI. AR 614-200, "Enlisted Personnel Management System," December 15, 1988, requires commanders to establish procedures to ensure that ASI-qualified soldiers serve in the positions for which they were requisitioned.

AR 350-35, "Army Modernization Training," May 30, 1990, prescribes policy, procedures, and responsibilities for Army modernization training. Sustainment training is an integral part of the unit's training. It is conducted in the unit or resident school to ensure continued expertise in the operations, maintenance, and use of equipment. This training is to be executed once the unit has completed the new equipment training.

Documenting Requirements. Documentation of requirements for soldiers in Europe trained on TACCS/SAMS (B5) was incomplete. AR 71-31, "Management System for Tables of Organization and Equipment," requires the MACOM to document ASI requirements. The fielding plan showed requirements for over 400 TACCS/SAMS-trained soldiers in Europe; however, only 19 positions had been documented in the TOE/MTOE. As a result, unit commanders were not aware of the assignment requirements for soldiers trained on TACCS/SAMS.

Assignments of Trained Operators. TACCS/SAMS-trained soldiers were ineffectively assigned. Personnel records showed that 1,493 soldiers in Europe had received specialized TACCS training and had earned ASI's for either SIDPERS (R3) or SAMS (B5). The ASI for SPBS-R (G3) was not tracked in Europe at the time of our audit. Of the 1,493 soldiers in Europe, 1,290 had received TACCS/SIDPERS training costing $9.5 million, and 203 had received TACCS/SAMS training costing $1.1 million.

To determine how effectively soldiers trained on TACCS were assigned in Europe, we analyzed the personnel records for the two ASI's related to SAMS and SIDPERS. In addition, we issued questionnaires to 600 TACCS operators. Their answers showed that soldiers trained on TACCS/SIDPERS were effectively assigned.

Although TACCS/SAMS-trained soldiers were assigned to the authorized MOS (76C), only 8 percent operated TACCS systems. For the 203 TACCS/SAMS-trained soldiers, records showed that 174 (86 percent) were assigned to the correct MOS (76C), 15 (7 percent) did not show a duty MOS, 8 (4 percent) did not have a primary MOS of 76C, and 5 (2 percent) were assigned to an MOS other than 76C. Of the 12 ASI positions coded in the personnel system, only 2 positions were filled with soldiers trained on TACCS/SAMS. Based on the responses to the questionnaires, we statistically projected that only 16 (8 percent) of the 203 TACCS/SAMS-trained soldiers operated TACCS systems. Because unit commanders used MOS's, not ASI's, as the primary criteria for assignments, untrained soldiers were operating TACCS computer systems for which other soldiers were already trained.

Sustainment Training. Units needed sustainment training for TACCS operators. To determine the effectiveness of the TACCS training program, we issued questionnaires to 600 TACCS operators in Europe. We received responses to 312 questionnaires, which showed that 299 operators had received training (i.e., classroom, on-the-job, etc.), but that 181 (76 percent) of 239 TACCS operators felt they needed additional or sustainment training. Thirteen soldiers had not received training, and 60 did not answer the question. The most difficult tasks cited were inquiries, changes in battle rosters, and uploading and downloading the system. AR 350-35, "Army Modernization Training," May 30, 1990, requires that soldiers receive sustainment training after they have received their initial training, and makes the unit commanders responsible for sustainment training. Field units have received computer-based instructional materials on sustainment training. These materials include end-user manuals and self-taught tutorials on the system's operations. In addition, assistance is available from the systems developers for SAMS, SPBS-R, and SIDPERS.

Actions Taken by the Army. On October 2, 1989, the Deputy Chief of Staff of the Army for Personnel (DCSPER) notified the major commands, including USAREUR, that TACCS-trained soldiers were not being assigned to operate TACCS systems. The notice stated that 1st PERSCOM would send a message to all personnel centers emphasizing ASI management at the local level; encourage requisitioning authorities to code requisitions with the proper ASI's; and ensure that 76C/76Y TACCS-trained soldiers are assigned according to the TACCS fielding plan. A message was sent to all commanders of the personnel centers on November 21, 1989.

RECOMMENDATIONS FOR CORRECTIVE ACTION

We recommend that the Commander, U.S. Army, Europe, and Seventh Army:

1. Comply with Army Regulation 71-31, "Management System for Tables of Organization and Equipment," July 20, 1989, to modify Tables of Organization and Equipment to reflect the Additional Skill Identifiers for operators of Tactical Army Combat Service Support Computer Systems.

2. Notify unit commanders that the military training team at 1st Personnel Command is available to train operators of the Tactical Army Combat Service Support Computer System.

MANAGEMENT COMMENTS

Management agreed with Finding B. and Recommendation B.1., but disagreed with Recommendation B.2. Management stated that the documentation of ASI's for TACCS operators is a necessary action that is under way. On Recommendation B.2., management also stated that sustainment training is a command responsibility, and that 1st PERSCOM had previously created a military training team. One of the missions of the team is to assist commanders with training on TACCS/SIDPERS.

AUDIT RESPONSE TO MANAGEMENT'S COMMENTS

We changed Recommendation B.2. to read: "Notify unit commanders that the military training team at 1st Personnel Command is available to train operators of the Tactical Army Combat Service Support Computer System." This replaced our recommendation to notify unit commanders to implement sustainment training for personnel assigned to TACCS in compliance with AR 350-35, "Army Modernization Training," May 30, 1990.

COST OF RETROFITTING TACCS VERSUS DESKTOP III

SYSTEM	PLANNED NUMBER OF RETROFITS	COST OF PLANNED RETROFITS	ACTUAL NUMBER OF RETROFITS	COST OF ACTUAL RETROFITS	COST OF DESKTOP III	SAVINGS
SIDPERS						
V1	2,506	$12,788,118	1,600	$ 8,164,800	$ 3,119,358	$ 1,503,960
V2	2,151	16,743,384	680	5,293,120	5,064,653	6,385,611
SARSS						
V2	1,326	10,321,584	216	1,769,817	3,821,730	4,730,037
SAMS2						
V2	23	179,032	22	302,617	3,443	(127,028)
SAAS-4						
V2	286	2,226,224	205	1,842,372	278,883	104,969
Other 1/			91	708,344		(708,344)
	6,292	$42,258,342	2,814	$18,081,070	$12,288,067	$11,889,205

TACCS-E prices:
V1 retrofit $5,103
V2 retrofit $7,784 (includes 1 remote)

Cost of retrofit for 6,292 systems	$42,258,342
Cost of retrofit for 2,814 systems	(18,081,070)
Total adjusted cost	24,177,272
Cost of Desktop III	(12,288,067)
	11,889,205
2-year warranty (Desktop III) 2/	9,932,560
Adjusted total savings	$21,821,765

1/ Software development and testing.
2/ Savings are based on the cost of 2 years of maintenance for 3,478 TACCS units.

COST OF RETROFITTING TACCS VERSUS DESKTOP III
(continued)

COMPARISON OF TACCS-E AND DESKTOP III

Tactical Army Combat Service Support Computer System - Enhancement (TACCS-E)	Desktop III
80386 microprocessor	80386 microprocessor
400 MB SCSI hard disk	340 MB SCSI hard disk
	168 MB SCSI hard disk
4 MB RAM	4 MB RAM
BTOS II/POSIX	UNIX/POSIX
Clock speed - 20 MHz	Clock speed - 20 MHz
1200 baud	1200 baud
5.25" .630 MB floppy	3.5" 1.44 MB floppy
24 MB cartridge tape drive	40 MB tape backup unit
12" monochrome video display	15" monochrome monitor
7020T multi-ply printer	Letter-quality printer
Maintenance cost extra	Unix documentation
	Hard carrying case
	Includes 2 years' maintenance

Price of each system:

Retrofitting V1 $5,103	Advanced POSIX workstation $3,363
Retrofitting V2 $7,784	(includes letter-quality printer)

DEPARTMENT OF THE ARMY
OFFICE OF THE SECRETARY OF THE ARMY
WASHINGTON, DC 20310-0107

Office, Director of Information
Systems for Command, Control,
Communications, & Computers

SAIS-PD

27 AUG 1991

MEMORANDUM FOR OFFICE OF THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE (AUDITING)

SUBJECT: Revised Audit Report on the Use of Mobile Computers - Army (Project No. OFE-0024)

This memorandum provides response to comments and recommendations contained in your revised draft report on the Use of Mobile Computers - Army (Project No. OFE-0024). The DOD IG sent the initial draft report to the Army on February 21, 1991. The Army provided a response on April 24, 1991. As a result of some program changes plus many discussions between DOD IG and Army personnel, the DOD IG revised their draft report. This memorandum reflects an updated Army response to the revised DOD IG draft report provided the Army on August 13, 1991. The Army continues to nonconcur with portions of the report. Army rationale follows below.

A general comment, and concern, is that the report contains incomplete information and does not reflect examination of the total Army automated information system (AIS) architecture. The AIS architecture includes current and future operational requirements, hardware, software (application and executive system software) and maintenance. Primarily, the report examines computer hardware and some maintenance information, with minimum coverage detailing other AIS elements. Remarks concerning hardware, and limited comments about software, are very general in nature. They do not adequately address some major hardware issues (i.e., proprietary hardware, open systems architecture) and software issues (i.e., proprietary software, cost of new hardware changes, conversion costs).

The Army nonconcurs with the revised recommendation A-1 on OSD oversight for the Corps/Theater ADP Service Center, Phase II (CTASC-II) program. Recommendation A-1 requests "The ASD(C3I) increase oversight of the Army's CTASC-II program to ensure it is economically justified and specifically meets the Army's Airland Battle doctrine."

Early in the CTASC-II program OSD provided CTASC-II program oversight. In August 1988, responding to an Army request, OSD (after review) removed CTASC-II from their

automated information system (AIS) list. OSD assigned the Army CTASC-II program management approval. As required, the Army adheres to all regulatory and policy requirements concerning program management. The Army maintains the increased OSD oversight recommendation is without merit. It also ignores the continuing OSD oversight of various Army Standard Army Management Information Systems (STAMIS) using CTASC-II.

The report makes numerous comparisons between CTASC-II systems and the CTASC-I/DAS3 systems deployed in Southwest Asia (SWA). Such comparisons can be misleading. CTASC-II is a new program. The hardware deployed to SWA were prototypes for which baselines have yet to be finalized. In contrast, the CTASC-I/DAS3 systems deployed were mature, optimized variants. While the old systems may perform adequately in certain operational environments, there is little if any potential growth left. CTASC-II provides the Army a capability of meeting the future Army architecture needs.

The Army provides the following comments to correct or update data contained in the DOD IG report. The comments also explain the operational need to continue phasing out CTASC-I and DAS3 with the CTASC-II. CTASC-II fieldings, in conjunction with the full fielding of TACCS, will allow the phaseout of all 12 CTASC-I systems and over 200 of the DAS3 systems.

(1) The CTASC-I and DAS3 systems are proprietary hardware systems that use dated design and technology. This makes it very expensive to maintain the hardware and obtain repair parts. As time goes on these problems will increase. Currently the contractor is limiting his DAS3 support to maintenance activities. Both the CTASC-I and DAS3 are at or near their projected economic life cycle end. The Army needs to replace them now. This is especially true of the DAS3 system that has been in the Army's automation inventory since the late 1970s.

(2) The CTASC-I and DAS3 (hardware and software configurations) are not compatible with the Army's desire to obtain systems supporting open system architectures. Lacking open systems design hinders interaction (communications, processing, and software portability) between dissimilar systems adding costs to Army programs that try to accomplish these capabilities. The CTASC-II system, with its increased communications capability and UNIX based operating system provides the Army with a platform capable of supporting future STAMIS and automation communication requirements.

(3) As designed years ago, CTASC-I and DAS3 met their operational requirements. However, due to changing Army requirements, costs, dated technology, etc. these systems cannot meet current or future requirements. The Army based the CTASC-II operational requirements on Airland Battle doctrine which stresses reduced signature (electronic, thermal and physical), speed, survivability, tactical air transportability, cross country mobility and sustainment. CTASC-II meets these requirements; CTASC-I and DAS3 do not.

(4) The DAS3 and CTASC-I signature (electronic, thermal and physical) and mobility due to large size and vehicle numbers do not support survivability on the AirLand Battlefield. For example, during Operations Desert Shield/Storm one commander ordered CTASC-I processing reduced due to signature concerns. Current doctrine requires rapid system air deployment minimizing airlift sorties. CTASC-II can fit into C-130 aircraft, freeing precious C-141 and C-5 aircraft for more pressing requirements. Only the CTASC-II can drive-on/drive-off a C-130. The CTASC-II ROC requires the system to traverse cross country ten percent, secondary roads 60 percent, and primary roads 30 percent of movement time. CTASC-I/DAS3 systems do not meet these requirements.

(5) In contrast to CTASC-II, DAS3 and CTASC-I system design depends on batch processing and dumb terminal input. This creates communication and processing choke points that slow information flow. This situation does not meet the needs of future Combat Service Support (CSS) automated applications. STAMIS currently operating on DAS3 and CTASC-I are batch systems that process data at specified times during the day. To ignore the future communications capability by keeping batch oriented systems will deny the Army the rapid information flow required for modern battlefield support.

(6) Failure to field the new STAMIS on CTASC-IIs will deprive the CSS community of needed functions. Besides replacing CTASC-Is and DAS3s, CTASC-II provides automation capabilities and opportunities not previously available to the Army with CTASC-I and DAS3, i.e., Standard Army Maintenance System (SAMS) and Theater Army Medical Management Information System (TAMMIS). Therefore, comments regarding "x" number of CTASC-IIs replacing "X" number of CTASC-Is and DAS3s ignore the additional applications processing on CTASC-II systems.

(7) Although the CTASC-I performed fairly well in SWA, there was doubt the four CTASC-Is in country could support operational requirements in a timely manner. To achieve required performance levels, LTG Pagonis, USARCENT

Support Command (Prov), requested upgrading all four CTASC-Is in SWA. IBM estimated upgrading costs at $1.0 million per system. While alternative solutions improved the situation, the request surfaced CTASC-I system operational shortcomings.

(8) Both DAS3 and CTASC-I are manpower intensive systems. The CTASC-II Required Operational Capability (ROC), page 5, paragraph 8, identifies a potential force structure reduction with the CTASC-II system fielding.

(9) DAS3 and CTASC-I cannot interface with the Army's primary tactical communication systems (i.e., Mobile Subscriber Equipment (MSE)) now fielding. While it may be possible to add this capability to older systems, a major development effort involving significant funding would be required. To integrate the full CTASC-II communications capability into the CTASC-I would be expensive and not as productive.

(10) The report equates the CTASC-II costs (including procurement and other costs) with the CTASC-I maintenance costs only. The report fails to estimate DAS3 systems replacement costs. Additionally, the report fails to recognize personnel cost savings obtained when CTASC-II replaces CTASC-I and DAS3 systems.

(11) CTASC-I yearly costs do not include all costs required to support a system. Associate Support Items of Equipment (ASIOE), i.e., vans, trucks, pump units, generators, etc. are an example of cost data not included. Also, data does not include existing DAS3 and ASIOE sustainment costs, or CTASC-II and STAMIS sunk costs. For example the recurring annual CTASC-I executive software costs are $63,000 per system. This figure does not include the $134,811 one time charge for each system upon activation. The foregoing information is not reflected in DOD IG figures cited. DOD IG representatives may validate these charges with Information Systems Software Center Executive Software Requirements Division.

(12) The report fails to address annual DAS3 system support costs on depot expenditures, spare parts procurements and contract services. Additionally, the $22,723 DAS3 maintenance figure per system used includes spare parts cost, but does not cost salaries for the "green-suit" maintainers required. Generally there are two (sometimes three for Corps level DAS3s) maintainers authorized per system. Most are E-3 through E-6. Also a comparative cost analysis must include projection of future DAS3 support costs for systems remaining in the inventory if the Army fails to field CTASC-IIs.

(13) Because CTASC-II and TACCS will replace the DAS3, the Army ceased training DAS3 maintainers and dropped the MOS. If the Army delays DAS3 phase out, required "green-suit" maintenance will not be available. Either the Army contracts maintenance out to civilian sources, or restores the MOS and re-starts training maintainers.

Specific comments regarding Recommendations A-2, "The U.S. Army, Director of Information Systems for Command, Control, Communications and Computers terminate the upgrade to the Tactical Army Combat Service Support Computer System" and Recommendation A-3, "The Deputy Chief of Staff for Operations and Plans require that nonruggedized off-the-shelf computers be used instead of more costly ruggedized computers, unless ruggedization is specifically justified."

Acknowledged in the revised report, the Army made important changes to the TACCS and TACCS-E programs. The Army continues reviewing microcomputer requirements and available hardware platforms for opportunities to reduce costs and to provide improved performance through nonruggedized nondevelopmental item (NDI) equipment purchases. As a result the Army will only field 2,990 of 6,292 validated TACCS-E requirements. This change is due to a continuing STAMIS requirements review and new equipment availability that better meets the Army's needs. The Army disagrees with the $23.3 million cost savings identified in the report. The $23.3 million figure is suppose to represent the savings from the Army upgrading only half the TACCS systems (to TACCS-E) as originally planned. All costs were not considered, plus the proposed $3,363 Desktop III configuration would not satisfy all requirements, i.e., tactical comm, to the same level as the TACCS/TACCS-E system.

The Army remains concerned with the accuracy of data presented to support Recommendation A-2 and A-3. The comments supplied below attempt to clarify misconceptions that may exist regarding the TACCS and TACCS-E programs. The Army maintains nonruggedized, commercial equipment is not always appropriate for use in a tactical arena. The following comments address this issue.

(1) Failure to address major cost factors regarding use of nonruggedized, commercial equipment on the battlefield flaws the analysis supporting the audit conclusion.

(a) The auditors concluded that the nonruggedized Zenith Unit Level Computer (ULC) micro was more reliable than TACCS. They based that conclusion on data

shown on page 8 of the August 13, 1991 draft report. The data shows a density of 2,376 TACCS requiring a total of 2,168 repairs. They compare that data to an ULC density of 324 requiring 198 repairs. The auditors did not consider that a TACCS usually consists of two computers (a master logic module and a remote logic module). The TACCS is more complex and more capable (i.e., it contains two internal modems, and a tape device that the ULC does not have). It is illogical to conclude the ULC is more reliable when the data actually shows the opposite to be true. A more accurate comparison of TACCS and ULC would show a TACCS density of 4,752 systems with 2,168 incidents of repair. The correct rate to use in this comparison is a TACCS Repair Rate of 45.6 percent instead of the 91.2 percent. (b) Since the ULC configuration is significantly less capable than the TACCS, set up should be easier. However, the ULC cannot meet the TACCS STAMIS requirement. Therefore, it is not appropriate for comparison.

(2) Neither the overall statements on costs nor the report's Appendix A address the costs associated with software conversion. The software now operating on the TACCS hardware system needs redesign and rewriting to run on commercial (non-UNISYS) hardware.

(3) The data fails to identify the costs of system and logistical documentation, plus training costs required to support the hardware provided to a soldier.

(4) The data missed the costs of development, testing and training systems hardware. Also missed were the costs of testing and training documentation required for new fielded systems. A copy of the April 23, 1991 USAREUR Memorandum for HQDA commenting on the draft report is at the Enclosure. USAREUR's comments on recommendations A-1, A-2 and A-3 are consistent with this memorandum. The USAREUR memorandum supports the ODISC4 position on recommendations B-1 and B-2. In conclusion, the Army is proceeding in the most economic, cost effective manner. The Army has expended much effort and resources to plan, develop and begin implementation of an executable CSS automation architecture that satisfies user requirements. CTASC-II is critical to the architecture. CTASC-Is and DAS3s are nearing, or have reached, the end of their economic and operational life. TACCS, TACCS-E, Lightweight Computer Unit (LCU) and Common Hardware/Software (CHS) systems are components of the architecture. So is nonruggedized, commercial equipment. Improvements in the survivability of nonruggedized equipment will equate to increased use in the future.

SAIS-PD
SUBJECT: Draft Audit Report on the Use of Mobile Computers (Project No. OFE-0024)

The ODISC4 POC for this action is Mr. Daniel Merrick, SAIS-PPT, (703) 695-7058.

FOR THE DIRECTOR:

Robert F. Manning

ROBERT F. MANNING
Colonel, GS
Deputy Director for Policy

Encl

CF: (w/encls)
SAIG-PA
PEO STAMIS
PM TACMIS

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY, EUROPE, and SEVENTH ARMY
APO NEW YORK 09403

REPLY TO
ATTENTION OF

AEAGX-IA (36-2b)

23 APR 1991

MEMORANDUM FOR HQDA (SAIG-PA), WASH DC 20310-1734

SUBJECT: DODIG Draft Report on the Use of Mobile Computers -- Army, 21 Feb 91 (OFE-0024) (90-D)

1. References:

a. AR 36-2, Processing Internal and External Audit Reports and Followup on Findings and Recommendations, 6 Sep 86.

b. Memorandum, HQDA, SAIG-PA, 28 Feb 91, SAB.

2. HQ USAREUR/7A has reviewed the subject draft report. HQ USAREUR/7A command reply is enclosed.

3. The HQ USAREUR/7A POC for DODIG audits is Ms. Willenburg, AUTOVON 370-7906.

FOR THE COMMANDER IN CHIEF:

Encl

BRUCE L. WHITE
CPT, AG
Administrative Officer

A. Mobile Computer System

FINDING

The Army's planned improvements were unnecessary. The current Corps and Theater Automated Data Processing Service-Phase I (CTASC-I) and Decentralized Automated Service Support System (DAS3) computer systems met the Army's peacetime and wartime needs for mobility and data processing. Nonruggedized, commercially available computers were more economical than the planned upgrade of 6,300 ruggedized Tactical Army Combat Service Support Computer System (TACCS) computers. The audit also showed that nonruggedized computers required less maintenance than the ruggedized TACCS computers. Terminating the CTASC-II project and replacing the TACCS computers with nonruggedized computers instead of upgrading the TACCS would save $187 million.

RECOMMENDATION A-1:

Terminate the Corps and Theater Automated Data Processing Service Center-Phase II project.

COMMAND COMMENTS A-1:

Nonconcur. This recommendation is based upon an analysis that does not consider several germane factors. First, the CTASC-I and DAS3 systems are at the end of their life cycles. A fuller examination of maintenance costs and operating difficulties will reveal a more significant shortfall in processing capabilities than is discussed. CTASC-I mobility and processing capability are insufficient to support the wartime requirements of this theater. The DAS3 especially is experiencing maintenance related problems that in the long term will involve considerable costs; the maintenance contract for DAS3 is scheduled to end in FY94. Second, the audit does not consider the sunk costs of CTASC-II development in its financial assessment. Third, the audit was conducted before Operation Desert Shield / Storm; the experience gained in operating CTASC-I & II and DAS3 in an extremely harsh climatic and physical environment should be assessed.

RECOMMENDATION A-2:

Terminate the upgrade to the Tactical Army Combat Service Support Computer System.

COMMAND COMMENTS A-2: See COMMAND COMMENTS A-3

RECOMMENDATION A-3:

Replace the Tactical Army Combat Service Support Computer System with commercial, nonruggedized computers rather than upgrading current systems.

COMMAND COMMENTS A-2 & A-3:

Nonconcur. Termination of the TACCS and TACCS Enhancement would enable this command to migrate to an open system architecture available with Desktop III. However, the TACCS-E is projected to have a POSIX interface and be MS-DOS compatible. Any cost savings from termination of the program must be decremented by costs associated with STAMIS development and the transition from BTOS (Burroughs Twenty Operating System) to the MS-DOS/UNIX operating systems available with Desktop III. Additionally, the experience gained with TACCS and with commercial, nonruggedized desktop computers during Operation Desert Shield / Storm should be assessed as part of the decision process. The Project Managers for the systems, the functional proponents and the Department of the Army Program Executive Officer - Communications should be included on the distribution scheme of this report and be provided an opportunity to respond.

B. Training and Assignments of TACCS Users

FINDING

Only 16 of the 203 soldiers in Europe who were trained to operate the Tactical Army Combat Service Support Computer System/Standard Army Maintenance System (TACCS/SAMS) were working on TACCS computers. Their training was valued at $1.1 million. The fielding plan showed that over 400 soldiers with TACCS/SAMS skills were needed in Europe, but only 19 positions had been documented in the Modified Table of Organization and Equipment (MTOE), and 12 positions had been coded in the personnel records. Personnel records showed that soldiers trained on TACCS/SAMS were assigned to only 2 of the 12 coded positions. This occurred because soldiers' assignments were based on their Military Occupational Specialties (MOS's), not their Additional Skill Identifiers (ASI's). Further, unit commanders had not implemented sustainment training programs for TACCS operators.

RECOMMENDATION B-1:

Comply with Army Regulation 71-31, "Management System for Tables of Organization and Equipment" July 20, 1989, to modify the Table of Organization and Equipment to reflect the Additional Skill Identifiers for operators of Tactical Army Combat Service Support Computer Systems.

COMMAND COMMENTS B-1:

Concur. The documentation of Additional Skill Identifiers for TACCS operators is a necessary action that is underway.

RECOMMENDATION B-2:

Notify unit commanders to implement sustainment training for personnel assigned to Tactical Army Combat Service Support Computer Systems, in compliance with Army Regulation 350-35, "Army Modernization Training" May 30, 1990.

COMMAND COMMENTS B-2:

Nonconcur. Sustainment training is an ongoing command responsibility. 1st PERSCOM had previously created a Military Training Team. One of the missions of the MTT is to assist commanders with training TACCS/SIDPERS.

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SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS RESULTING FROM AUDIT

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
A.1.	Improve economy and efficiency of operations.	
A.2., A.3.	Improve economy and efficiency of operations.	$21.8 million one-time savings; funds put to better use.

Fiscal Year	Amount	Accounting Class
1991	$40,035,036	2112020

B.1., B.2., B.3.	Improve economy and efficiency of operations and trained personnel.	Improved operations through better use of resources.

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ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Assistant Secretary of Defense (Force Management and Personnel), Washington, DC
Headquarters, U.S. European Command, Stuttgart, FRG

Department of the Army

Headquarters, U.S. Army, Europe, and Seventh Army, Heidelberg, FRG
1st Personnel Command, Schwetzingen, FRG
32d Army Air Defense Command, Darmstadt, FRG
7th Medical Command, Heidelberg, FRG
21st Theater Army Area Command, Kaiserslautern, FRG
200th Theater Army Materiel Management Center, Zweibrucken, FRG
1st Transportation Movement Control Agency, Oberursel, FRG
Headquarters, 5th Signal Command, Worms, FRG
59th Ordnance Brigade, Pirmasens, FRG
VII Corps, Stuttgart, FRG
1st Armored Division, Ansbach, FRG
7th Personnel Group, Nellingen, FRG
2d Corps Support Command, Nellingen, FRG
V Corps, Frankfurt, FRG
III Armored Division, Frankfurt, FRG
5th Personnel Group, Reforger 1990, FRG
12th Aviation Brigade, Reforger 1990, FRG
3d Corps Support Command, Wiesbaden, FRG
8th Infantry Division, Bad Kreuznach, FRG
Headquarters, U.S. Army Forces Command, Fort McPherson, GA
2d Armored Division, Fort Hood, TX
Director, Information Systems for Command, Control, Communications and Computers, Washington, DC
U.S. Army Tactical Command and Control System, Fort Leavenworth, KS
U.S. Army Communications-Electronics Command, Fort Monmouth, NJ
Headquarters, U.S. Army Training and Doctrine Command, Fort Monroe, VA
U.S. Army Logistics Center, Fort Lee, VA
Project Manager, European Tactical Management Information System, Schwetzingen, FRG
Project Manager, Tactical Management Information Systems, Fort Belvoir, VA
U.S. Army Information Systems Selection and Acquisition Activity, Alexandria, VA

ACTIVITIES VISITED OR CONTACTED
(continued)

Non-DoD Activities

Army-Air Force Exchange Service, Giessen, FRG
General Services Administration, Washington, DC

Non-Government Activities

UNISYS Corporation, Pirmasens, FRG
UNISYS Corporation, Heidelberg, FRG
UNISYS Corporation, Paoli, PA

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